

R E M A R K S

Claim Amendments

Minor editorial amendments were made to claim 1.

Claim 5 was amended to include features that are supported in the specification on page 6, lines 16 to 22. These features are set forth in claim 1.

With respect of Rule 116, entry of the amendments is respectfully requested, since the features added to claim 5 hereinabove were recited in claim 1 prior to the final rejection.

Applicants' Present Claims

The present claims are directed to a high tensile cold-rolled steel sheet consisting essentially of 0.04 to 0.13% C, 0.3 to 1.2% Si, 1.0 to 3.5% Mn, 0.04% or less P, 0.01% or less S, 0.02 to 0.07% Al, by mass, and a balance of Fe and inevitable impurities; having a microstructure containing 50% or larger area percentage of ferrite and 10% or larger area percentage of martensite, and having a ratio of intervals of the martensite in the rolling direction to those in the sheet thickness direction of 0.85 to 1.5; and having a nano strength of the martensite of 8 GPa or larger (see applicants' present claim 1).

The present claims also pertain to a method for manufacturing high tensile cold-rolled steel sheet, comprising the steps of: hot-rolling a steel slab consisting essentially of 0.04 to 0.13% C, 0.3 to 1.2% Si, 1.0 to 3.5% Mn, 0.04% or less P, 0.01% or less S, 0.02 to 0.07% Al, by mass, and a balance of Fe

and inevitable impurities, into a steel sheet, followed by coiling at a coiling temperature ranging from 450°C to 650°C; cold-rolling the coiled steel sheet at a cold-rolling reduction ranging from 30 to 70%; annealing the cold-rolled steel sheet by heating to a temperature range of [the coiling temperature + the cold-rolling reduction percentage x 4.5] to [the coiling temperature + the cold-rolling reduction percentage x 5.5] (°C); and cooling the annealed steel sheet to a temperature of 340°C or below at an average cooling rate of 10°C/s or higher, thereby manufacturing a high tensile cold-rolled steel sheet having a microstructure containing 50% or larger area percentage of ferrite and 10% or larger area percentage of martensite, and having a ratio of intervals of the martensite in the rolling direction to those in the sheet thickness direction of 0.85 to 1.5; and having a nano strength of the martensite of 8 GPa or larger (see applicants' present claim 5).

The steel sheets provided by applicants' present claims are desirably used as reinforcing members of pillars and dashboards of automobiles.

Obviousness Rejection Under 35 USC 103

Claims 1 to 8 were rejected under 35 USC 103 as being unpatentable over JP 2002-226937 for the reasons set forth in item no. 5 on pages 2 to 3 of the December 8, 2008 Office Action.

Arguments Supporting the Patentability
Of Applicants' Present Claims

It was admitted in the previous Office Action of March 18, 2008 that JP 2002-226937 differs from applicants' claim 1 in that JP 2002-226937 does not disclose a ratio of intervals of the martensite in the rolling direction to those in the sheet thickness direction of 0.85 to 1.5 or the nano strength of the martensite. These features are now recited in applicants' claim 5.

The aforesaid feature regarding the ratio of intervals is an important feature of applicants' claims 1 and 5 for the reasons set forth in item 2-3 bridging pages 12 and 13 of the present specification. The advantageous results of said feature are pointed out on page 13, lines 18 to 25 of the specification, which is reproduced as follows:

"...when the ratio of intervals of martensite is between 0.85 and 1.5, and is close to 1, that is, when there is not much difference between the intervals of phases in the sheet thickness direction and those in the rolling direction, the migration of dislocation is suppressed by the martensite, which increases the amount of accumulated dislocation to increase the deformation stress, thereby improving the crashworthiness. In addition, the elongation also increases because the distribution of martensite becomes relatively uniform."

The position taken in the December 8, 2008 Office Action appears to be that method steps of some examples of both the

above-identified application and JP 2002-226937 fall within the requirements of the method defined by applicants' claim 5, and that the properties of the steel product as defined in applicants' claim 1 would be met by JP 2002-226937.

The following Table shows whether or not the examples in JP 2002-226937 fall within the requirements of applicants' claim 5.

Table

Examples in Tables 3, 4, 6 and 7 in JP 2002-226937

No.	Upper limit of annealing temperature defined by applicants' claim 5/°C	Lower limit of annealing temperature defined by applicants' claim 5/°C	Actual annealing temperature /°C	Fall within or out of range	Secondary phase
1	995	1065	880	out	P
2	983	1048	800	out	P
3	893	958	820	out	B
4	893	958	650	out	B
5	988	1053	750	out	B
6	859	921	720	out	M
7	899	961	760	out	M
8	665	725	820	out	P
9	598	653	780	out	R
10	960	1040	840	out	-
11	949	1011	720	out	-
12	959	1021	770	out	-
13	966	1034	840	out	-
14	820	880	760	out	B
15	925	985	700	out	B
16	915	985	790	out	R
17	1065	1135	645	out	M+B
18	893	958	820	out	M
19	913	978	800	out	M
20	1043	1108	750	out	M
21	920	980	800	out	B
22	770	830	820	in	B
23	770	830	650	out	B
24	748	803	790	in	P
25	768	823	820	in	P
26	808	863	700	out	P

All of the Examples of JP 2002-226937 fall outside the scope of the requirements of applicants' claim 5, except that Examples 22, 24 and 25 of JP 2002-226937 fall within the annealing temperature requirements of applicants' claim 5. However, as shown in the column of the secondary phase of the above Table, Example 22 of JP 2002-226937 has a bainite phase and Examples 24 and 25 of JP 2002-226937 have a pearlite phase as a secondary phase. Examples 22, 24 and 25 of JP 2002-226937 do not have a 10% or larger area percentage of a martensite phase, as called for in applicants' present claims.

The area percentage of martensite is a very important constituent feature of the presently claimed invention. To attain a 16000 MPa·% or larger strength-elongation balance ($TS \cdot El$) and to improve the crashworthiness of an automobile part made from the steel sheet recited in applicants' claims, the area percentage of martensite is required to be 10% or more. If the area percentage of martensite is smaller than 10%, satisfactory crashworthiness cannot be attained.

It is therefore respectfully submitted that one of ordinary skill in the art would not arrive at the presently claimed invention and the advantageous results obtained therefrom based on the disclosure of the reference.

Withdrawal of the 35 USC 103 rejection is thus respectfully requested.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

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Respectfully submitted,



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Enc.: PETITION FOR EXTENSION OF TIME